

REMARKS

In the March 11, 2004 Office Action, the Examiner noted that claims 1-48 were pending in the application; rejected claims 1-12, 14-16, 18-29, 31, 32 and 34-48 under 35 U.S.C. § 103(a) and objected to claims 13, 17, 30 and 33 as dependent from rejected base claims. In rejecting the claims, U.S. Patents 6,601,026 to Appelt et al.; 6,434,524 to Weber; 5,915,001 to Uppaluru; and 5,524,139 to Jones (References A-D, respectively) were cited. Claim 49 has been added; thus, claims 1-49 remain in the case. The Examiner's rejections are traversed below.

The Application

The subject application is directed to a system for automatically updating a grammar used by an interactive voice response system to recognize speech. The information used to update the grammar may come from many possible sources external to the interactive voice response system, such as news reports, messages in e-mail or voice mail, or from a personal information manager, such as a calendar application. For example, the information may be used to extend a grammar that provides topics for questions which can be asked by a user.

U.S. Patent 6,601,026 to Appelt et al.

The Appelt et al. patent is directed to information retrieval by natural language querying. Two grammars are used by the system. The first grammar is used in setting up system 100 to populate database 109 in Fig. 1 (see column 5, lines 36-42), while the second grammar is a "query grammar" used by natural language user interface 110 (see column 5, lines 8-13). The first grammar is created by a human analyst who reviews a "sample of typical documents of the kind associated with a topic to be supported by the system 100" (column 6, lines 63-64) and then, as illustrated in Fig. 2, the human analyst generates 204 a set of rules. Typical documents are selected 206 to form a training corpus against which the set of rules are run 208. If the human analyst determines 210 that the results generated by the set of rules are not acceptable, the human analyst updates 212 the set of rules and runs the updated rules against the training corpus. Upon finding the results acceptable, the set of rules are saved 214 as templates 111 (Fig. 1) and are run against a larger volume of text to produce entries in database 109 for use in responding to queries (see column 7, lines 34-49). The second grammar is created in a similar process illustrated in Fig. 9 and described at column 12, lines 23-35.

U.S. Patent 6,434,524 to Weber

The Weber patent is directed to an object interactive user interface using speech recognition and natural language processing in a computer system 100 which, as illustrated in Fig. 1, receives audio input from one user at a time via a microphone 110 and manual (keyboard/mouse) input 106 and provides output to the user via display 104 and speaker 112. As illustrated in Fig. 2, the system contains a natural language processor 202 which uses a context-specific dictation module 217 relying on context-specific grammar 212, as well as a more general natural language processing database 218 that relies on general grammar 214. During use of the context-specific grammar (306 in Fig. 3A), if the speech is not recognized, the general grammar is searched 310 and, if necessary, input may be dictated by the user, or entered manually. When the user indicates that recognition is performed correctly (356 in Fig. 3D), entries are updated 362 in the general grammar and context-specific grammar.

U.S. Patent 5,915,001 to Uppaluru

The Uppaluru patent is directed to a system for providing and using voice and speech data files accessible via the Internet. The system relies on "patterns representing speaker dependent training information " (column 2, lines 57-58) and provides a voice interface via a telephone to appointment and e-mail services using text-to-speech conversion as described with reference to Fig. 3 in column 11.

U.S. Patent 5,524,139 to Jones

The Jones patent discloses a system in which the present invention can be implemented and was incorporated by reference in the first paragraph of the Detailed Description of the Invention section of the application.

Rejections under 35 USC § 103(a)

On pages 2-17 of the Office Action, claims 1-12, 14-16 18, 19, 23-29, 31, 32, 34, 35, 39-44 and 47 were rejected under 35 U.S.C. § 103(a) as unpatentable over Appelt et al. in view of Weber. As discussed above, Appelt et al. relies upon a human analyst to create and modify grammars that are used for indexing documents and subsequently in querying the indexed documents. The only thing that occurs automatically in the system taught by Appelt et al. is the obtaining and indexing of additional documents. On the other hand, in Weber updating is performed in response to additional input provided by the user of a computer having an interactive voice recognition interface, not automatically or from an external source of information.

It is submitted that a person of ordinary skill in the art would not find it obvious to modify the system taught by Appelt et al. based on Weber to include "a grammar that is automatically updated from sources of information external to the interactive voice response system" (claim 1, lines 2-3), because neither reference discloses an automatic process that requires the amount of effort required to update a grammar of an interactive voice response (IVR) system from sources of information external to the IVR system. In the Office Action, it was acknowledged that Appelt et al. does not disclose automatic updating, but it was asserted that "the corpus 103 of free-text documents ... external to the interactive voice response system" was used to "update query grammar rules," citing block 518 in Fig. 9 and column 12, lines 23-47. However, what is illustrated in Fig. 9 of Appelt et al. is "a process 510 for training the natural language user interface 110 of FIG. 1" (column 12, lines 23-24). The word "updating" does not appear in block 518 and the use of the word "updated" on lines 43 and 44 of column 12 clearly relate to the same process described above with respect to block 212 in Fig. 2, i.e., a human analyst modifying the rules applied to a training corpus until acceptable results are obtained, so that the rules can be saved for subsequent use, in this case when queries are received.

The Examiner asserted that Weber discloses "automatically updating a grammar" at column 3, lines 4-7 and column 12, lines 53-67. However, as discussed above, no suggestion of an operation performed "automatically", i.e., substantially without any instructions from a human after initiating operation, is taught or suggested by Weber. Rather, the cited portion of column 3 is in the SUMMARY and as described in more detail in column 12, the updating occurs based on user responses to prompts from the interactive speech recognition interface of the computer system 100 and appears to always use display 104 (see column 12, lines 46-48). Automatically updating a grammar using information external to an IVR system as recited in claim 1 requires a great deal of knowledge of how the external information relates to the IVR system, but has no need of a display, since a human is not involved. The system in Appelt et al. describes the updating as performed by a human analyst, so that it is unnecessary to incorporate the analyst's knowledge into the system. Similarly, Weber relies on information provided by a user to drive the updating performed by the system. In other words, there is very little updating that is performed automatically in either Appelt et al. or Weber; both rely on humans to perform the difficult task of determining what changes need to be made in the grammar.

Limitations similar to those discussed above with respect to claim 1 are recited in the other independent claims 23, 39 and 47 and therefore, claims 1, 23, 39 and 47, as well as claims 2-12, 14-16, 18-19, 24-29, 31, 32, 34, 35 and 40-44 which depend therefrom patentably distinguish over Appelt et al. in view of Weber.

Furthermore, claims 2 and 24 have been amended to clarify that the topics that are automatically obtained are used "in automatically updating the grammar" (e.g., claim 2, last line). In rejecting claim 2, the Examiner cited the extraction of topics for the purpose of indexing the documents in the system taught by Appelt et al. (see column 7, lines 33-47). As discussed above, neither of the grammars used in the system taught by Appelt et al. are automatically updated, nor is there any suggestion of automatically obtaining information to be used for updating either grammar. Therefore, it is submitted that claims 2 and 24, in addition to claims 3, 4, 12-14 and 25-30 which depend therefrom, further patentably distinguish over the prior art for this additional reason.

Since the obtaining recited as being automatically performed in claim 2 has been amended to clearly recite that it is used to automatically update the grammar, not to index documents, the communication connection between the IVR system and a news report provider, as recited in claims 3 and 25 to obtain additional documents to be indexed, is not obvious from the network 530 taught by Appelt et al. Therefore, claims 3 and 25 and claims 4 and 26-30 which depend therefrom further patentably distinguish over the prior art.

In rejecting claim 5, it was asserted that column 7, lines 33-52 of Appelt et al. discloses "updating the grammar using the keywords" that were extracted from news articles. However, as noted two paragraphs above, this portion of column 7 describes the process of "setting up the system" (column 7, line 33) to obtain "results [that] are translated into entries in the database 109" (column 7, lines 46-47) and "templates representing various topic-specific information contained in the texts and relating that information back to the texts" (column 7, lines 50-52). Nothing in column 7 teaches or suggests "automatically updating the grammar using the keywords" as now recited at the end of claim 5. As discussed above, Appelt et al. only discloses a human analyst modifying the grammars and Weber only discloses updating a grammar based on responses of a user to prompting in the interactive speech interface of a computer. Therefore, it is submitted that claim 5 and claim 41 which recites similar limitations, as well as claims 6-11, 28-30 and 42 which depend therefrom, further patentably distinguish over the prior art.

Claim 27 also recites limitations similar to claim 5 and, since it depends from claim 23, the "updating [of] the grammar using the keywords" (claim 27, last line) is performed by "at least one program" (claim 23, line 1), i.e., automatically. Therefore, claim 27 further distinguishes over the prior art for reasons similar to claim 5.

In rejecting claim 8, block 106 of Fig. 1 and column 6, lines 25-29 of Appelt et al. were cited as disclosing "identify[ing] the keywords for said extracting" related to "pre-filtering".

However, if the “PreFilter” 106 in Fig. 1 of Appelt et al. represents something that occurs prior to creating database 109 and template 111. As discussed above, neither the database 109 nor template 111 represents a grammar, while the keywords that are identified from the “list of potential keywords” (claim 8, line 2), are recited in claim 5 from which claim 8 depends as being used for “automatically updating the grammar” (claim 5, last line). Therefore, the pre-filtering performed by Appelt et al. is not relevant to what is recited in claim 8 and claim 8 further patentably distinguishes over the prior art.

In rejecting claim 15, the Examiner cited column 7, lines 46-50 and column 10, lines 6-11 as disclosing “topic-specific information” to be added to “grammar template files 310 which are located in database 109”. Reference numeral 310 is used in Appelt et al. in connection with the terms “templates” (e.g., column 8, line 41), “template files” (column 10, line 6) and “grammar files” in the statement that “query grammar files ... are analogous to the grammar files 310” (column 11, lines 9-10). The last quotation is the only occurrence where the term “grammar files” is associated with a reference numeral. When read as a whole, reference numeral 310 on line 10 of column 11 appears to be a typographical error. All other uses of the word “grammar” is in association with processing text output by PreFilter 106, or input by a user and block 310 in Fig. 3 is labeled “Templates” and is described at column 8, lines 8-41 as being “the output of the domain phase transducer” (column 8, lines 40-41) that results from processing “free text from the free-text document 103 of the data acquisition unit 102 (FIG. 1)” (column 8, lines 8-10). The “cascaded, nondeterministic finite state automation 300 for processing natural language text in the information extraction engine 108” (column 7, lines 53-55), as discussed above, was described in the paragraph at column 7, lines 33-52 as a process using “grammar files ... run against text” (column 7, line 46). In other words, except for line 10 of column 11, reference numeral 310 is used to refer to something that results from applying grammar files to text in documents, not the grammar files themselves. Therefore, despite this typographical error, Appelt et al. does not disclose “automatically obtaining grammar words to be added to the grammar” (claim 15, lines 1-2).

Furthermore, reference numeral 502 in Fig. 7 of Appelt et al. is a news article, not a “message for a user” (claim 15, line 2). Nothing has been cited or found in Appelt et al. suggesting the use of a message for a user as the source of the text to be used for indexing, let alone text to be used for updating a grammar. Since claims 31 and 43 recite limitations similar to claim 15, it is submitted that claims 15, 31 and 43, as well as claims 16-20, 32-38 and 44 which depend therefrom further patentably distinguish over the prior art for the additional reasons discussed above.

In rejecting claim 16, the Examiner again cited block 502 in Fig. 7 as corresponding to "the at least one message" (claim 16, line 2) which, as noted above, is defined in claim 15 as "for a user" (claim 15, last line). For the same reasons discussed above with respect to claim 15, it is submitted that Appelt et al. does not teach or suggest doing anything with a message for a user. Furthermore, as noted above, the database 109 in Appelt et al. is used in processing queries from natural language user interface 110 (see Fig. 1), not for "automatically updating the grammar" (claim 16, line 6) which is how "the corresponding questions and related message words" (claim 16, last 2 lines), identified by said comparing recited in claim 16, are used. For the above reasons, it is submitted that claim 16 also further patentably distinguishes over the prior art. In addition, claim 32 recites limitations similar to claim 16 and since it depends from claim 23, the "updating [of] the grammar with the corresponding questions and related message words" (claim 32, last 2 lines) is performed by "at least one program" (claim 23, line 1), i.e., automatically. and claim 32 similarly further distinguishes over the prior art.

In rejecting claim 18, the Examiner cited column 3, lines 4-7 and column 12, lines 53-67 of Weber as teaching "automatically adding ... new information ... to ... grammar files". However, as discussed above, the cited portion of column 3 is in the SUMMARY and as described in more detail in column 12, relates to changes made to the grammar based on user responses to prompting by the voice interface of the computer disclosed in Weber. Thus, there is no suggestion in the combination of Appelt et al. and Weber of "automatically adding words to the grammar based on a source of the message" as recited in claim 18 and it is submitted that claim 18 and claim 34 which recites similar limitations, further patentably distinguish over the prior art.

In rejecting claim 19, column 5, lines 14-20 and column 14, lines 9-12 of Appelt et al. were cited as disclosing a "sound stream" and block 506 in Fig. 8 of Appelt et al. was cited as disclosing a "message-ID". However, claim 19 recites determining "the source of the message ... based on automatic number identification provided when the voicemail message was received." It is submitted that a voicemail message is more than a sound stream, because it implies a sender, a recipient and storage for later retrieval by the recipient. Furthermore, the text "Message-ID" in Fig. 8 of Appelt et al., even if it was followed by symbols, would not be equivalent to "automatic number identification provided when the voicemail message was received", because there is no associated voicemail message and "automatic number identification" is a term of art in the telecommunications field that is not equivalent to text in a news article. Therefore, it is submitted that claim 19 and claim 35 which recites similar limitations, further patentably distinguish over the prior art.

On pages 17-22 of the Office Action, claims 20-22, 36-38, 45 and 46 were rejected under 35 U.S.C. § 103(a) as unpatentable over Appelt et al. in view of Weber and Uppaluru. Nothing has been cited or found in Uppaluru suggesting modification of Appelt et al. and Weber to overcome the patentable distinctions discussed above. Since claim 20 depends from claim 15, claims 21 and 22 depend from claim 1, claim 36 depends from claim 34, claims 37-38 depend from claim 31 and claims 45 and 46 depend from claim 39, it is submitted that claims 20-22, 36-38, 45 and 46 patentably distinguish over the prior art for the reasons discussed above with respect to claims 1, 15, 23, 31, 34 and 39.

Furthermore, as noted above, Uppaluru discloses the use of a speaker-dependent speech recognizer which requires the user of the system to train the recognizer by speaking words added to the grammar before those words can be recognized, and thus, could not be used for "adding information to the grammar from an address book entry for the sender of the e-mail" (claim 20, last 2 lines). Column 9, line 50 and column 11, lines 45-50 of Uppaluru which were cited as disclosing this limitation refers to the ability of a user to interact with an address book through a voice interface. There is no suggestion here, nor has any suggestion been found elsewhere of looking up an address book entry corresponding to the sender of an e-mail to obtain information to be added to the grammar used for recognizing speech. Therefore, it is submitted that claim 20 and claim 36 which recites similar limitations, further patentably distinguish over the prior art for these additional reasons.

In rejecting claim 21, column 9, line 50 and column 11, lines 36-44 of Uppaluru were cited as disclosing using a calendar as a source of information. It is submitted that what is disclosed at this portion of Uppaluru is insufficient to suggest "automatically updating the grammar based on calendar information stored for a user asking the spoken question" because the calendar information in the system taught by Uppaluru is not used for modifying anything, nor is there any suggestion in any of the references that a grammar might be modified automatically based on anything. Therefore, it is submitted that claim 21 and claims 37 and 45 which recite similar limitations, further patentably distinguish over the prior art for these additional reasons.

Claim 22 depends from claim 21, claim 38 depends from claim 37 and claim 46 depends from claim 45. Therefore, claims 22, 38 and 46 further patentably distinguish over the prior art for the reasons set forth above with respect to claims 21, 37 and 45. Furthermore, it is submitted that Uppaluru does not disclose "recognizing .. questions about locations ... found in the calendar information" (e.g., claim 22, last 2 lines) at column 11, lines 36-44, but merely making an audio recording and retrieving time and date information about appointments. It is

submitted that this is not enough to even suggest the limitation quoted above from claim 22. Therefore, it is submitted that claims 22, 38 and 46 further patentably distinguish over the prior art for this additional reason.

On pages 22 and 23 of the Office Action, claim 48 was rejected under 35 U.S.C. § 103(a) as unpatentable over Appelt et al. in view of Weber, Uppaluru and Jones. Nothing was cited or has been found in Jones that teaches or suggests modification of Appelt et al., Weber and Uppaluru to overcome the deficiencies noted above with respect to claim 47 from which claim 48 depends. Therefore, it is submitted that claim 48 patentably distinguishes over the prior art for the reasons set forth above with respect to claim 47.

New Claim 49

Claim 49 has been added to recite that the at least one processor in the information services system recited in claim 47 is programmed to obtain at least one set of topics in a manner similar to that recited in claim 2. Although the word "automatically" does not appear in claim 49, since the operation is being performed by a processor, it is submitted that claim 49 patentably distinguishes over the prior art for the reasons set forth above with respect to claim 2.

Summary

It is submitted that the cited references do not teach or suggest the features of the present claimed invention. Thus, it is submitted that claims 1-49 are in a condition suitable for allowance. Reconsideration of the claims and an early Notice of Allowance are earnestly solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

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If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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